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ABSTRACT

This teacher guide is part of the materials prepared for an individualized program for ninth-grade algebra and basic mathematics students. Materials written for the program are to be used with audiovisual lessons recorded on tape cassettes. For an evaluation of the program, see ED 086 545. In this guide, the teacher is provided with objectives for each topic area and guided to materials written for a given topic. Three short criterion tests are included for each topic covered. The work in this package focuses on the relationships between ratio, proportion, rate, percentage and fractions. This work was prepared under an ESEA Title III contra... (JP)

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ED 090010

BASIC MATH I

PACKAGE #01-11

RATIO AND PROPORTION

Prepared By

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RATIO AND PROPORTION

The use of ratio and proportion is one of our most powerful problem-solving techniques. When we say that it costs $3.00 an acre to mow and rake hay, so it will cost $300.00 to mow and rake 100 acres, we have used ratio and proportion. The ratios are $3.00 per acre and $300.00 per 100 acres. Placing an equal sign between these two ratios makes a proportion: $3.00 per acre = $300.00 per 100 acres. Remember your work with rate pairs? Two rate pairs separated by an equal sign form a proportion. Two ratios separated by an equal sign form a proportion. Rate pairs or ratios are usually expressed in fractional form: $\frac{3}{1} = \frac{300}{100}$. Everyday problems, science problems, per cent problems, geometry problems, and many others are solved most easily by the use of ratio and proportion.

The Goal of this package is:

For you to understand ratio and proportion well enough to solve problems.

PACKAGE OBJECTIVES:

1. Given a proportion containing one variable, solve it, naming the solution with either a fractional numeral or a decimal numeral.

2. Given an applied problem in naming a rate, solve it.

3. Given an applied problem, solve it by use of a proportion.

4. Given a per cent problem solve it by means of a proportion.

5. Given a problem in conversion from one measuring system to another, solve it by means of a proportion.

I.U. #01-11-01

RATIO AND PROPORTION

OBJECTIVES:

1. Given a problem in which it is necessary to name a ratio, write it as a fractional numeral.

2. Given two ratios, determine if they are proportional.

3. Given a proportion containing one variable, solve it, naming the answer with either a fractional numeral or a decimal numeral.

ACTIVITIES:

1. Study pages 341 - 342, "Ratio", and do margin exercises 1 - 10. (Objective 1)

2. Study "Proportion", pages 342-343, and do margin exercises 11 - 20. (Objectives 2 and 3)

3. Since this is the beginning of a new topic, you should work more of the exercises on pages 349 and 350 than you normally might. Be especially sure that you can solve proportions like the ones on page 350. (Objective 3)

CRITERION TESTS

Criterion Test 01-11-01-01

1. There are 70 boys and 80 girls enrolled in high school at Malfunction Junction.

   (a) What is the ratio of boys to girls?
   (b) What is the ratio of boys to total enrollment?
   (c) What is the ratio of total enrollment to girls?

2. If the following statements are proportions, answer "true", if not, answer "false".

   (a) $\frac{7}{5} = \frac{6}{4}$ (b) $\frac{7}{3} = \frac{21}{9}$ (c) $\frac{2}{3} = \frac{6}{9}$

3. Solve and name the answer, if fractional, both as a fractional numeral and a decimal numeral:

   (a) $\frac{n}{5} = \frac{8}{10}$ (b) $\frac{4}{12} = \frac{3}{x}$ (c) $\frac{x}{5} = \frac{6}{10}$ (d) $\frac{2}{24} = \frac{x}{6}$

Criterion Test 01-11-01-02

1. A rancher's calf crop consists of 65 bulls and 45 heifers..

   (a) What is the ratio of bulls to the total calf crop?
   (b) What is the ratio of heifers to the total calf crop?
   (c) What is the ratio of heifers to bulls?

2. Are the following proportional? (Answer yes or no.)

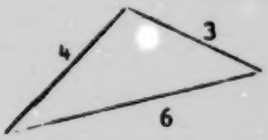
   (a) $\frac{5}{3}$ and $\frac{20}{11}$ (b) $\frac{5}{3}$ and $\frac{21}{12}$ (c) $\frac{7}{3}$ and $\frac{28}{12}$

3. Solve, naming the fractions as fractional numerals and decimal numerals:

   (a) $\frac{8}{9} = \frac{32}{n}$ (b) $\frac{5}{x} = \frac{4}{10}$

   (c) $\frac{x}{11} = \frac{7.1}{2}$ (d) $\frac{25}{100} = \frac{n}{20}$

Criterion Test 01-11-01-03

1. 

(a) What is the ratio of the longest side to the shortest side?

(b) What is the ratio of the longest side to the perimeter?

(c) What is the ratio of the shortest side to the perimeter?

2. Are the two ratios proportional? (Answer yes or no.)

(a) $\frac{3}{4}$ and $\frac{24}{100}$

(b) $\frac{3}{4}$ and $\frac{21}{28}$

(c) $\frac{5}{7}$ and $\frac{35}{49}$

3. Solve and name any fractions both as a fractional numeral and a decimal numeral.

(a) $\frac{n}{5} = \frac{2}{3}$

(b) $\frac{2}{5} = \frac{n}{3}$

(c) $\frac{2}{n} = \frac{5}{3}$

(d) $\frac{2}{5} = \frac{3}{n}$

ANSWERS TO CRITERION TESTS

Criterion Test 01-11-01-01

1. (a) $\frac{70}{80}$ (b) $\frac{70}{150}$ (c) $\frac{150}{80}$ (The numerator and denominator must not be interchanged.)

2. (a) false (b) true (c) true

3. (a) n = 4
   (b) x = 9
   (c) x = 3
   (d) x = .5 or $\frac{1}{2}$

Criterion Test 01-11-01-02

1. (a) $\frac{65}{110}$ (b) $\frac{45}{110}$ (c) $\frac{45}{65}$ (The numerator and denominator must not be interchanged.)

2. (a) no (b) no (c) yes

3. (a) n = 36
   (b) n = 12.5 or $12\frac{1}{2}$
   (c) n = $39\frac{1}{20}$ or 39.05
   (d) n = 5

Criterion Test 01-11-01-03

1. (a) $\frac{6}{3}$ (b) $\frac{6}{13}$ (c) $\frac{3}{13}$

2. (a) no (b) yes (c) yes

3. (a) n = $\frac{10}{3}$ or $3\frac{1}{3}$ or $3.\overline{3}$
   (b) n = $\frac{6}{5}$ or $1\frac{1}{5}$ or 1.2
   (c) n = $\frac{6}{5}$ or $1\frac{1}{5}$ or 1.2
   (d) n = $\frac{15}{2}$ or $7\frac{1}{2}$ or 7.5

I. U. #01-11-02

RATE

OBJECTIVES:

1. Given a ratio of two different kinds of measures, name it as a rate.

2. Given a ratio, write it in its simplest form.

3. Given an applied problem in naming a rate, solve it.

ACTIVITIES:

1. Study page 344, and do margin exercises 21 - 30. (Objectives 1, 2, 3)

2. Since rate problems are very common you should be very certain you can do them. All of the odd numbered problems on pages 351, 352 would be good practice for you but the applied problems are especially important. Almost all the problems you meet outside of school are applied problems. (Objective 3)

Criterion Test 01-11-02-01

1. (a) A car goes 230 miles in five hours, what is its rate?

   (b) If it takes 6 pounds of sugar to make 2 gallons of lemonade what is the rate in pounds per gallon?

   (c) If I can read 1000 words in 5 minutes, what is my rate in words per minute?

2. If the mass of one object is .730 kilograms and the mass of a second object is 540 grams, what is the simplest fractional numeral to express the ratio of the first to the second?

3. If you can run five blocks in two minutes, what is your rate in blocks per minute

Criterion Test 01-11-02-02

1. If Bill Player can get a hit once out of every four times that he bats, what is his batting rate in hits per time at bat?

2. If my dog weighs 40 pounds and your dog weighs 480 ounces what is the simplest ratio of your dog's weight to my dog's weight?

3. (a) If it takes 16 grams of oxygen to combine with 2 grams of hydrogen to produce 18 grams of water, what is the simplest ratio for mass of oxygen to the mass of hydrogen in that chemical reaction?

   (b) What is the ratio of the mass of hydrogen to the mass of water?

   (c) What is the ratio of the mass of oxygen to the mass of water?

Criterion Test 01-11-02-03

1. It takes six buckets of water, six buckets of sand and one sack of cement tc mix mortar.

   (a) At what rate do you use the water per sack of cement?

   (b) At what rate do you use the sand?

2. If a lot is 15 yards wide, 100 feet long, what is the simplest ratio of the width to length?

3. If a car travels 400 miles in 6 hours, what is its average speed? (Rate)

Answers to Criterion Tests

Test 01-11-02-01

1. (a) 46 miles per hour (b) 3 pounds per gallon

   (c) 200 words per minute

2. $\frac{73}{54}$

3. 2.5 blocks per minute or $\frac{5}{2}$ blocks per minute

Test 01-11-02-02

1. $\frac{1}{4}$ hit per time at bat or .25 hits per time at bat.

2. $\frac{3}{4}$

3. (a) $\frac{8}{1}$ or 8 (b) $\frac{1}{9}$ (c) $\frac{8}{9}$

Test 01-11-02-03

1. (a) 6 buckets per sack

   (b) 6 buckets per sack or 1 bucket of sand per 1 bucket of water.

2. $\frac{17}{20}$

3. $66\frac{2}{3}$ miles per hour or $66.\overline{6}$ miles per hour

I. U. #01-11-03

PROPORTION PROBLEMS

You will need to recall:

How to solve a proportion.

OBJECTIVES:

1. Given an applied problem, translate it into a proportion.

2. Given an applied problem, solve it by use of a proportion.

ACTIVITIES:

1. Study pages 345 and 346, do the margin exercises and the odd numbered applied problems on pages 353 and 354. (Objective 1)

Although this instructional unit appears short, do not assume it is unimportant. Proportions are extremely useful.

Criterion Test 01-11-03-01

1. (a) In an election in Podunk, Jerry Jerk beat Grandpa Graft by a ratio of 4 to 3. If Jerk got 500 votes, how many votes did Grandpa get?

   (b) The scale on a map is $\frac{1}{4}$ inch per 25 miles. What distance does $3\frac{1}{4}$ inches represent?

   (c) The ratio of hydrogen to oxygen in water is 2 to 1 by volume. If we have ten gallons of hydrogen to react with some oxygen to make water, how many gallons of oxygen will be used?

   (d) A recipe calls for 3 cups of flour, a tablespoon of baking powder, two eggs, a pinch of salt and $1\frac{1}{2}$ cups of milk. How much of the other ingredients will be required if we decide to use a dozen eggs?

Criterion Test 01-11-03-02

1. (a) If Ronny Runningham can run one mile in four minutes, at that rate how far could he run in one hour? (He'd be something else if he could maintain that rate.)

   (b) If the sale price of three shirts is $5.49, at that rate how many can be bought for $25.00?

   (c) If Howie Works makes $16.00 per day for a ten hour day, what does he make in one hour?

   (d) If a pendulum makes 8 swings in five seconds, how many will it make in a minute?

Test 01-11-03-03

1. (a) If Jack Sprat gains 2 pounds a month (30 days) how much will he gain in one day?

   (b) Armand Hammer can hammer 15 nails in one minute. If he could continue to pound nails at that rate, how many hours will it take him to nail 100 boards if each board needs four nails?

   (c) If Miss Digemdotty can write one problem in ten minutes, how many can she write in a nine hour day?

   (d) If you can work one problem in five minutes, how many can you work in a forty minute period?

Answers to Criterion Tests

Test 01-11-03-01

1. (a) $\frac{4}{3} = \frac{500}{x}$, $4x = 1500$, $x = 375$

(b) $\frac{.25}{25} = \frac{3.25}{x}$ $.25x = 3.25 \cdot 25$ $x = \frac{3.25 \cdot 25}{.25}$

$x = 325$

(c) $\frac{2}{1} = \frac{10}{x}$, $2x = 10$, $x = 5$

(d) $\frac{3}{2} = \frac{x}{12}$ $x = 18$ cups flour
6 tablespoons baking powder
6 pinches of salt
9 cups of milk

etc.

Test 01-11-03-02

1. (a) $\frac{1}{4} = \frac{x}{60}$, $4x = 60$, $x = 15$ miles

(b) $\frac{3}{5.49} = \frac{x}{25.00}$ $5.49x = 75.00$ $x = 13.6$

but he can't buy .6 of a shirt so the answer is that he can buy 13 shirts. (He will have 33¢ change)

(c) $\frac{16}{10} = \frac{x}{1}$ $10x = 16$, $x = \$1.60$

(d) $\frac{8}{5} = \frac{x}{60}$ $5x = 480$, $x = 96$

Answers to Criterion Tests (Cont.)

Test 01-11-03-03

1. (a) $\frac{2}{30} = \frac{x}{1}$ $30x = 2$, $x = \frac{2}{30} = \frac{1}{15}$

(b) $\frac{15}{1} = \frac{400}{x}$ $15x = 400$ $x = 26.\overline{6}$

$\frac{1 \text{ hour}}{60 \text{ minutes}} = \frac{x}{26.6}$ $60x = 26.6$ $x = .\overline{4}$ hours

(c) $\frac{1}{10} = \frac{x}{540}$ $10x = 540$ $x = 54$ problems

(d) $\frac{1}{5} = \frac{x}{40}$ $5x = 40$ $x = 8$ problems

I. U. #01-11-04

PROPORTION AND PERCENT

OBJECTIVES:

1. Given a percent problem, solve it by means of a proportion.

ACTIVITIES:

This instructional unit is not included in the textbook. You will need to view tape number 01-11-04 to receive your instruction on the objective. Perhaps you already know how to use proportion to solve percent problems.

Suppose a salesman's commission rate is 20% and he sells $18,540 worth of furnaces. How can we find his commission by proportion?

First we must recognize that in a problem like this, some number is 100%. In this problem $18,540.00 is 100% of what the salesman sold. It is all of what he sold. We call the 100% the percent. We call the $18,540.00 the percentage, or the number represented by the per cent. The percent and percentage can be paired. Thus 100% is paired with $18,540.00 in this problem.

We can also pair the 20% with the commission, so 20% is paired with the commission, or 20% is paired with x.

Once we have these two pairs clearly in mind, we can write a percent ratio and a percentage (number) ratio. In this problem the percents are 20% and 100% and the percent ratio is either $\frac{20}{100}$ or $\frac{100}{20}$. (It is best to form a habit of writing percent ratios in the same order every time. We will make fewer errors that way. So let's write our percent ratios with the 100% as the denominator. Since percent means per 100 or times $\frac{1}{100}$ this order of writing our ratio should be easy to remember) In this problem we are considering two percentages (numbers) $18,540.00 and the commission x. We can write a ratio of percentages as $\frac{x}{\$18,540.00}$ or $\frac{\$18,540.00}{x}$.

(Cont.)

If we want to form a proportion of these two ratios (percent ratio and percentage ratio) we must write the two ratios in the same order. Since we have decided to use 100% for the denominator of the percent ratio we have $\frac{20}{100}$ $\begin{matrix}\text{(small)}\\\text{(larger)}\end{matrix}$ The percentage ratio must be in the same order. Should we write $\frac{x}{\$18,540.00}$ or $\frac{\$18,540.00}{x}$? Is x larger or smaller than 18,540.00? The percentages will have the same order as the percents with which they are paired.

x is paired with 20%
$18,540.00 is paired with 100%

20 is less than 100 so x is less than $18,540.00 and our proportion should be written:

$$\frac{\text{(small)}\ 20}{\text{(larger)}\ 100} = \frac{x}{\$18,540.00}\ \begin{matrix}\text{(small)}\\\text{(larger)}\end{matrix}$$

Both ratios in same order.

All that's left to do is solve the proportion.

Of course, the unknown quantify may be the larger or smaller percent or the larger or smaller percentage. It will not always appear as in the above example.

(Cont.)

Look at these examples:

Problem	Think	Write
150 is what percent of 300?	300 is paired with 100% 150 is paired with x The percent ratio is $\frac{x}{100}$ The number ratio is $\frac{150}{300}$ same order	$\frac{x}{100} = \frac{150}{300}$
What percent of 30 is 1?	30 is paired with 100% 1 is paired with x percent ratio is $\frac{x}{100}$ same order percentage ratio is $\frac{1}{30}$	$\frac{x}{100} = \frac{1}{30}$
20 is 50% of what?	20 is paired with 50% x is paired with 100% percent ratio is $\frac{50}{100}$ same order percentage ratio is $\frac{20}{x}$	$\frac{50}{100} = \frac{20}{x}$
10 is what percent of 60?	60 is paired with 100% 10 is paired with x percent ratio is $\frac{x}{100}$ same percentage ratio is $\frac{10}{60}$ order	$\frac{x}{100} = \frac{10}{60}$

If the procedure seems complicated, remember that all we are doing is writing a number ratio and a per cent ratio in the same order and placing an equal sign between them.

See if you can solve the odd numbered problems on pages 280 and 281 by this method.

Criterion Test 01-11-04-01

1. Solve the following problems by proportion; show the original proportion and the answer.

   (a) Due to inflation the price of steak rose 4%. If the increase was 6¢ a pound what was the price of steak before the increase?

   (b) If a man earned $9,600 per year and had a 6% increase in salary what was the amount of the increase?

   (c) The sales tax on a car is $168, and the sales tax rate is 6%. What was the purchase price of the car before taxes?

Criterion Test 01-11-04-02

1. Solve the following problems by proportion; show the proportion and the answer.

   (a) If the sales tax on a purchase of $960.00 is $48.00, what is the sales tax rate?

   (b) A man received a 5% raise in pay. If his salary before the raise was $6,400.00, how much was the raise?

   (c) What percent of 8.4 is 2.2? (To the nearest whole percent)

Criterion Test 01-11-04-03

1. Solve the following problems by proportion; show the proportion and the answer.

   (a) If $85.00 is 20% of Joe's monthly income, how much is his monthly income?

   (b) If Donna Doogood gets 95% on a 35 question test, how many questions did she get right?

   (c) If Donnie Dolittle attends school 83% of the time, how many days of the 180 day school year does he attend?

Answers to Criterion Tests

Test 01-11-04-01

1. (a) $\frac{4}{100} = \frac{6}{x}$ $x = 150$ \$1.50 was the price of the steak.

(b) $\frac{6}{100} = \frac{x}{9,600}$ $x = 576$ \$576 was his increase.

(c) $\frac{6}{100} = \frac{168}{x}$ $x = 2800$ \$2800 was the price of the car.

Test 01-11-04-02

1. (a) $\frac{48}{960} = \frac{x}{100}$ $x = 5$ 5% was the sales tax rate.

(b) $\frac{5}{100} = \frac{x}{6,400}$ $x = 320$ \$320 was the amount of the raise.

(c) $\frac{x}{100} = \frac{2.2}{8.4}$ $x = 26$ 26% to the nearest whole percent.

Test 01-11-04-02

1. (a) $\frac{20}{100} = \frac{85}{x}$ $x = 425$ \$425 is his monthly salary.

(b) $\frac{95}{100} = \frac{x}{35}$ $x = 33.25$ problems, or 33 problems depending on whether fractional credit was allowed or not.

(c) $\frac{83}{100} = \frac{x}{180}$ $x = 149.4$ 149.4 days (He must have missed part of a day.)

I. U. #01-11-05

PROPORTION AND MEASURING SYSTEMS

You will need to recall:

1. The units of measuring length in the British-American system and the Metric system.

   Sometimes it is necessary to convert from one of these systems to the other. Proportions are very useful for this purpose.

OBJECTIVES:

1. Given a problem in conversion from one measuring system to another, solve it by means of a proportion.

ACTIVITIES:

There is no textbook lesson on this topic. You will want to view the tape number 01-11-05 to receive your instruction on this topic.

The United States is in the process of gradually changing over to the metric system. Suppose you own a farm and your fence is $\frac{1}{4}$ mile long, but the suppliers of wire have converted to the metric system. You want to know how many meters of wire to buy to put up $\frac{1}{4}$ mile of fence. You can solve this type of problem by means of a proportion. Most science textbooks and many mathematics textbooks have a table of "Metric equivalents of British-American units."

1.6 Kilometers = 1 mile 1 meter = 39.37 inches 2.54 centimeters = 1 inch 1 kilogram = 2.2 pounds 1 gram = .035 ounces 30.48 centimeters = 1 foot

(Cont.)

Here is how to use the table to solve the problem "How many meters is $\frac{1}{4}$ mile?"

Think: 1.6 kilometers is 1,600 meters so 1,600 meters is one mile.

Write this as a ratio $\frac{1600 \text{ meters}}{1 \text{ mile}}$. How many (x) meters is $\frac{1}{4}$ mile? Write this as a ratio $\frac{x \text{ meters}}{\frac{1}{4} \text{ mile}}$

These ratios are rates since they are measured in different units. If we have written the two rates in the same order they must be equal. They are equal if they both name the same number. They both name the ratio one, because if the numerator and denominator of a fraction are the same, the number named by the fraction is one.

They are in the same order because we have named a number of meters in the numerator of each ratio and a number of miles in the denominator of each ratio.

Since the two ratios are equal we can write a proportion. $\frac{1600}{1} = \frac{x}{\frac{1}{4}}$. The cross products are equal so $x = 1600 \cdot \frac{1}{4} = 400$.

If we want to buy enough wire to reach $\frac{1}{4}$ mile we should buy 400 meters of wire: View tape 01-11-05.

Try these problems, then turn to the next page to see the solutions.

1. How many feet are 20 meters?
2. 5 pounds is how many kilograms?
3. 5 kilograms are how many pounds
4. How many grams equal one pound?

Answers to Exercises

1. $\frac{1 \text{ foot}}{.3048 \text{ meters}} = \frac{x \text{ feet}}{20 \text{ meters}}$

$.3048x = 20$

$x = \frac{20}{.3048} = 65.6167$

65.62 feet to the nearest hundredth.

2. $\frac{1 \text{ kilogram}}{2.2 \text{ pounds}} = \frac{x \text{ kilograms}}{5 \text{ pounds}}$ $x = 2.\overline{27}$ kilograms

3. $\frac{1 \text{ kilogram}}{2.2 \text{ pounds}} = \frac{5 \text{ kilograms}}{x \text{ pounds}}$ $x = 11$ pounds

4. $\frac{1 \text{ gram}}{.0350 \text{ ounces}} = \frac{x \text{ grams}}{16 \text{ ounces}}$ $x = 457.142$ 457 grams

or

$\frac{1000 \text{ grams}}{2.2 \text{ pounds}} = \frac{x \text{ grams}}{1 \text{ pound}}$ $x = 454.\overline{54}$ grams

Criterion Test 01-11-05-01

1. Solve by using a proportion -- show the proportion and the answer.

   (a) How many ounces is 25 grams? (To the nearest hundredth ounce.)

   (b) How many centimeters make one yard?

   (c) How many meters make 100 yards?

Criterion Test 01-11-05-02

1. Solve by using a proportion - show the proportion and the answer.

   (a) How many yards make 100 meters?

   (b) How many meters make 3 miles?

   (c) How many kilograms make 2000 pounds?

Criterion Test 01-11-05-02

1. Solve by using a proportion - show the proportion and the answer.

   (a) 100 ounces are how many grams?

   (b) 10 pounds are how many kilograms?

   (c) Five miles are how many kilometers?

Answers to Criterion Tests

Test 01-11-05-01

1. (a) $\frac{1 \text{ gram}}{.0350 \text{ ounces}} = \frac{25 \text{ grams}}{x \text{ ounces}}$ $x = .88$ ounces

(b) $\frac{2.54 \text{ centimeters}}{1 \text{ inch}} = \frac{x \text{ centimeters}}{36 \text{ inches}}$ or $\frac{30.48 \text{ cent.}}{1 \text{ foot}} = \frac{x \text{ cent.}}{3 \text{ feet}}$

$x = 91.44$ centimeters $x = 91.47$ centimeters

(c) 100 yards = 3600 inches so

$\frac{39.37 \text{ inches}}{1 \text{ meter}} = \frac{3600 \text{ inches}}{x \text{ meters}}$ $x = 91.44$ meters

Test 01-11-05-02

1. (a) 30.48 centimeters = 1 foot
91.44 centimeters = 1 yard
.9144 meters = 1 yard

$\frac{.9144 \text{ meters}}{1 \text{ yard}} = \frac{100 \text{ meters}}{x \text{ yards}}$

$x = 109.3613$ yards

(b) $\frac{1.6 \text{ kilometers}}{1 \text{ mile}} = \frac{x \text{ kilometers}}{3 \text{ miles}}$ $x = 4.8$ kilometers

answer: 4800 meters

(c) $\frac{1 \text{ kilogram}}{2.2 \text{ pounds}} = \frac{x \text{ kilograms}}{2000 \text{ pounds}}$ $x = 909.\overline{09}$ kilograms

Test 01-11-05-03

1. (a) $\frac{1 \text{ gram}}{.0350 \text{ ounces}} = \frac{x \text{ grams}}{100 \text{ ounces}}$ $x = 2857$ grams

(b) $\frac{2.2 \text{ pounds}}{1 \text{ kilogram}} = \frac{10 \text{ pounds}}{x \text{ kilograms}}$ $x = 4.\overline{54}$ kilograms

(c) $\frac{1.6 \text{ kilometers}}{1 \text{ mile}} = \frac{x \text{ kilometers}}{5 \text{ miles}}$ $x = 8$ kilometers

THE END